

Museum (Natural History) where it was identified as *Arcyophora trigramma* Hampson; a species poorly represented in the BMNH, but the type specimen was from Mt. Abu in Rajasthan, and a further specimen from Malaysia.

In Sariska on two subsequent nights we looked for the presence of moths on spotlighted deer (*Axis axis*), nilgai (*Boselaphus tragocamelus*) and sambar (*Cervus unicolor*). Darkness fell at about 6.05 p.m., but no moths were seen before 6.20 p.m. Data on frequency and intensity of moth infestation are given in Table 1. Data clearly show the pattern of increasing frequency of infestation as night continues; the admittedly small sample giving almost 100% infestation rate from 7.00 to 7.30 p.m. Number of moths per animal showed no discernible pattern. On a return visit to Sariska in the late dry season in July 1985,

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no moths were seen during three evenings observation.

I noticed no obvious sign of discomfort or irritation even with the maximum number of twelve moths around one eye (nilgai). Eyes remained open and motionless for long periods with several moths stationary and all with their probosci inserted over the eyelid.

Such moths could be the vector of parasites which also use the eye as a host organ, such as nematodes of the conjunctival tubes.

Noctuidae moths have a wide distribution within South Asia, and feed on a variety of hosts. Despite questioning several naturalists and persons familiar with Sariska, I have not learnt of previous sightings there, or elsewhere in India.

I am grateful to Dr. Pratap Singh of the Forest Research Institute and to Dr. M. Honey of the British Museum of Natural History, London for assistance in identification.

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### 35. ZOOGEOGRAPHY OF INDIAN DACINAE (DIPTERA: TEPHRITIDAE)

(With two text-figures)

#### INTRODUCTION

The flies belonging to subfamily Dacinae (family-Tephritidae) commonly known as fruit flies, are serious pests of nearly all kinds of

fruits and vegetables. Dacinae is represented by 166 species belonging to 4 genera from the Oriental region. Of which, 43 species belonging to 2 genera namely, *Callantra* Walker (7 species) and *Dacus* Fabricius (36 species) are



Fig. 1. Distribution of Indian species of genus *Callantra* Walker (encircled number indicate endemic species, underlined number represent its original distribution): (1) *Callantra brachycera*, (2) *C. craboniformis*, (3) *C. eumenoides*, (4) *C. icariiformis*, (5) *C. munori*, (6) *C. sphaeroidalis* (*C. apicalis* not shown due to incomplete information).

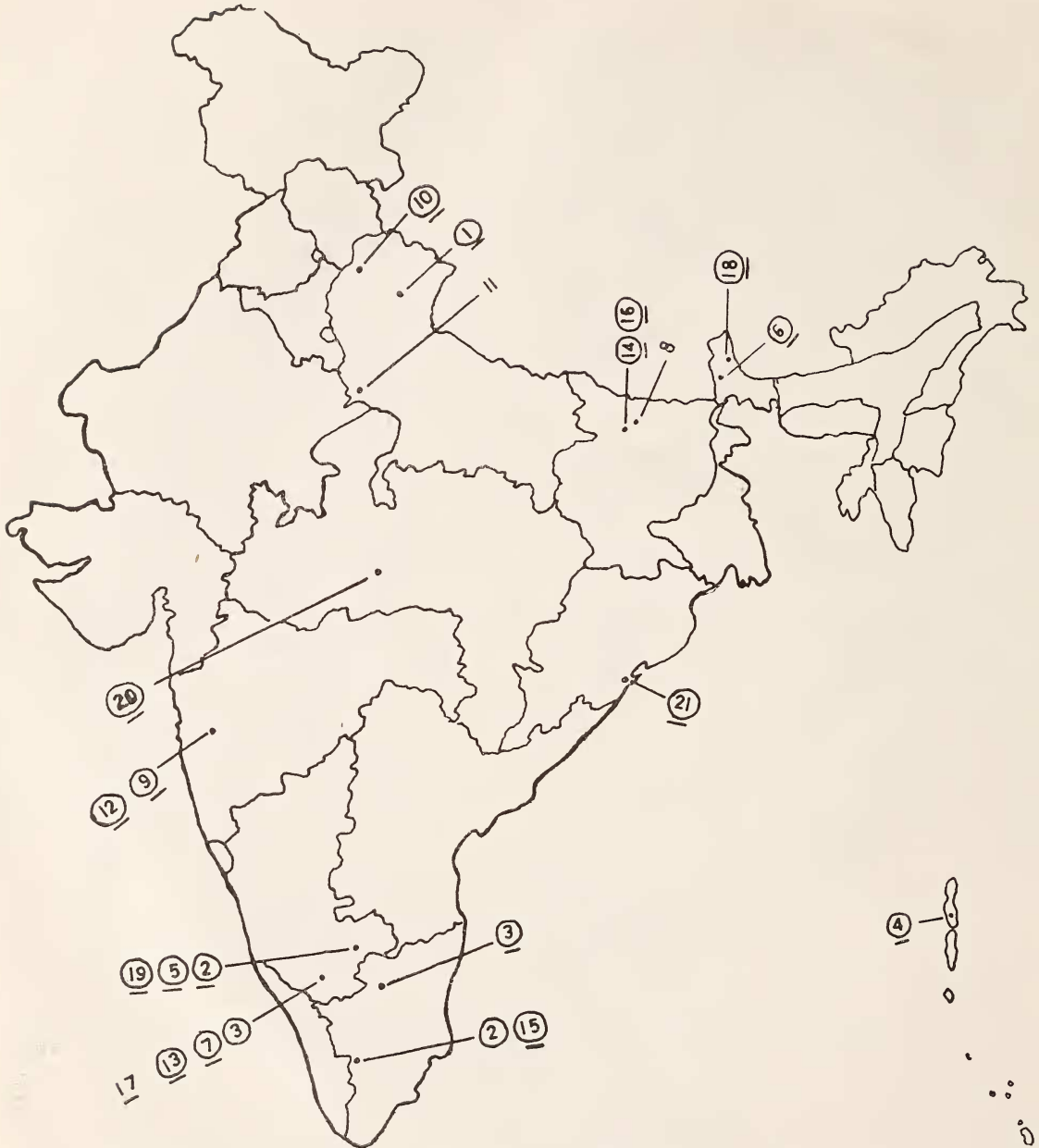


Fig. 2. Distribution of Indian species of genus *Dacus* Fabricius (encircled number indicate endemic species, underlined number represent its original distribution): (1) *Dacus* (*Afrodacus*) *aberrans pallescentis*, (2) *D.* (*A.*) *trilineatus*, (3) *D.* (*Bactrocera*) *affinis*, (4) *D.* (*B.*) *andamanensis*, (5) *D.* (*B.*) *bangalorensis*, (6) *D.* (*B.*) *biguttatus*, (7) *D.* (*B.*) *caryeae*, (8) *D.* (*B.*) *diaphorus*, (9) *D.* (*B.*) *dutti*, (10) *D.* (*B.*) *paratuberculatus*, (11) *D.* (*B.*) *parvulus*, (12) *D.* (*B.*) *poonensis*, (13) *D.* (*B.*) *scutellarius*, (14) *D.* (*Paradacus*) *pusaensis*, (15) *D.* (*P.*) *watersi*, (16) *D.* (*Paratridacus*) *citronellae*, (17) *D.* (*Parazeugodacus*) *bipustulatus*, (18) *D.* (*Polistomimetes*) *minax*, (19) *D.* (*P.*) *oscinae*, (20) *D.* (*Zeugodacus*) *duplicatus*, (21) *D.* (*Z.*) *gavisus* [*D.* (*B.*) *frogatti*, *D.* (*B.*) *nigrotibialis*, *D.* (*Paratridacus*) *expandens* and *D.* (*Polistomimetes*) *oleae* not included due to incomplete distributional records; rest of the species are widely distributed throughout India].

known from India. Among Indian species 19 (44.18%) are endemic. A Zoogeographical analysis of Indian Dacinae is presented here.

#### ZOOGEOGRAPHICAL ANALYSIS

In India sub-family Dacinae is represented by one tribe Dacini, 2 genera namely, *Callantra* Walker and *Dacus* Fabricius and 43 species. Of these 19 are endemic (44.18% endemism). Among Indian Dacinae Oriental element is the most dominant, which is represented by 38 species (88.60%), Ethiopian by 2 species (4.66%), Australian and Palaeartic by 1 species each (2.32% each). *Dacus* (*Zeugodacus*) *cucurbitae* Coquillett is widely distributed throughout the world.

The genus *Callantra* is known by 27 species from the Oriental region, of which, 7 are known from India. Among Indian species *brachycera* (Bezzi), *crabroniformis* (Bezzi) and *munori* (Zaka-ur-Rab) are endemic (42.85% endemism). *C. apicalis* (Shiraki) is known from Burma, Formosa and India, *C. eumenoides* (Bezzi) from Burma, India and Thailand, *C. icariiformis* Enderlein from Burma and India. *C. sphaeroidalis* (Bezzi) is fairly distributed throughout the Oriental region. The distribution of Indian species of *Callantra* is shown in fig. 1.

The genus *Dacus* has 16 subgenera and 137 species in the Oriental region. Among these 10 subgenera and 36 species are known from India. The distribution of Indian species of *Dacus* is shown in fig. 2. Among subgenera *Bactrocera* Macquart is the most dominant (17 species), followed by *Zeugodacus* Hendel (6 species), *Polistomimetes* (3 species), *Afrodacus* Bezzi, *Paradacus* Perkins, *Paratridacus* Shiraki (2 species each), *Didacus* Collart, *Hemizymnodacus* Hardy, *Leptoxyda* Macquart

and *Parazeugodacus* Shiraki are known only by one species each. No subgenera is endemic. Among the *Dacus* species 16 are endemic (43.48% endemism). Among the endemic species 15 have not been recorded from any other locality since their original discovery except *D. (Afrodacus) trilineatus* Hardy (recorded from Bangalore and Kodaikanal) and *D. (Bactrocera) affinis* Hardy (recorded from Yercaud and Mysore). The occurrence of *D. (B.) frogatti* (Bezzi) an Australian species is still doubtful in India.

*D. (Bactrocera) correctus* (Bezzi), *D. (B.) diaphorus* (Hendel), *D. (B.) latifrons* (Hendel), *D. (B.) nigrotibialis* (Perkins), *D. (Hemizymnodacus) diversus* Coquillett, *D. (Zeugodacus) caudatus* Fabricius, *D. (Z.) scutellaris* (Bezzi) and *D. (Z.) tau* (Walker) are widely distributed throughout the Oriental region.

Indian Dacinae also show relationship with the corresponding fauna of other regions. *D. (Didacus) ciliatus* Loew (a serious pest of cucurbits) originally described from Eritrea (Ethiopian region) is widely distributed throughout the Oriental region and has also been recorded from the Palaeartic region. *D. (Paratridacus) expandens* Walker (an Australian species) has also been reported from India, Malaysia, Singapore, Sri Lanka and Philippines. *D. (Leptoxyda) longistylus* Wiedemann (an Ethiopian species) is well represented in the Oriental region. *D. (Polistomimetes) oleae* (Gmelin) (a serious pest of olive fruits), which is a Palaeartic species has also been recorded from Ethiopian and Oriental regions. *D. (Bactrocera) dorsalis* Hendel and *D. (B.) zonatus* (Saunders) are the most dominant and serious pests of a number of fruits and vegetables. Both the species were originally described from oriental region, and have a tendency to become widespread as the

former is widely distributed throughout Australian, Nearctic, Oriental and Palaearctic regions and the latter has been recorded from Oriental, Palaearctic and Australian regions. *D. (Zeugodacus) cucurbitae* Coquillett (originally described from Hawaii Islands) is now widely distributed all over the world.

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### 36. LIFE-HISTORY PATTERN OF THE FRESHWATER LEECH *GLOSSIPHONIA WEBERI* (BLANCHARD) [HIRUDINEA: GLOSSIPHONIDAE]

(With a text-figure)

Glossiphoniid leeches suck the body fluids and sometimes devour the flesh of some freshwater snails (Mann 1962, Raut and Nandi 1980) some of which are disease-transmitting species. Considering the potentiality of glossiphoniid leeches in the biological control of the disease-transmitting snails, different workers have studied the ecology and life history of several leech species in the Western countries (Mann 1962, Bay *et al.* 1976). In India, very little attention has been paid to the bioecology of leeches. In recent years, Raut and Nandi (1980, 1984 and 1985) and Raut and Saha (*in press*) have furnished information on the food, feeding and growth rate of the leech *Glossiphonia weberi*. Ray (1980) and Raut (*in press*) have studied the parental care in *Helobdella nociva* and *Hemiclepsis marginata* respectively. Soota *et al.* (1982) supplied the data on the ecology of the leeches of the arid

region around Jodhpur. Since *G. weberi* is an effective predator of the disease transmitting snail *Lymnaea luteola* (Raut and Nandi 1980, 1984 and 1985) information on the life history of this leech species, described in this paper, would prove helpful in designing a successful control programme for the vector snails.

#### MATERIALS AND METHODS

On December 6, 1984, 15 gravid leeches (*G. weberi*) bearing eggs at different development stages were collected from the pond attached to Indian museum, Calcutta. They were reared in an aquarium under laboratory conditions. The leeches were supplied with juvenile individuals of a freshwater snail *Lymnaea luteola* as their food. Within a week the eggs hatched. Of a total of 30 new born leeches, those which hatched on December 10, 1984 and left their mother on December 12, 1984 were